

AMENDMENTS TO THE CLAIMS

Claims 1, 3, 5, 7-14 and 16 are amended. Cancel claim 15 without estoppel or disclaimer of the subject matter thereof. Claim 17 is added. All pending claims are produced below.

1. (Currently Amended) A robot control device for controlling a robot having a microphone, an imaging device and a self-position detection device, comprising:
 - a voice recognition part for recognizing the designation content of a designator based on sounds collected by the microphone;
 - an image recognition part for recognizing the designation content of the designator based on an image ~~imaged~~ captured by the imaging device;
 - a self-position estimation part for estimating the current position of the robot based on an output from the self-position detection device;
 - a map data base for retaining map data registering at least the position of an obstacle;
 - a decision part for deciding whether the movement to a specific position is required based on the recognition result of the voice recognition part and image recognition part;
 - a movement ease decision part for deciding movement ease to the specific position based on the current position of the robot estimated by the self-position estimation part and the map data position of the obstacle from the map data base when the decision part decides that responsive to the movement to the specific position [[is]] being required, wherein the current position of the robot indicates at least one of a warning area, a margin area and a safety area in which the robot exists, and each of the warning area, the margin area and the safety area is set based on the distance between the current position of the robot and the obstacle;

a behavior decision part for deciding the behavior according to the movement ease
decided by the movement ease decision part; and
a behavior control part for executing the behavior according to the decision of the
behavior decision part.

2. (Original) The robot control device according to claim 1, wherein the movement ease
decision part reads the position of the obstacle surrounding the movement route to the specific
position from the map data base, and sets at least two or more areas based on the distance from
the obstacle, and the behavior decision part decides the behavior according to an area containing
the specific position and an area where the robot exists.

3. (Currently Amended) The robot control device according to claim 1, wherein the
movement ease decision part including:

an obstacle recognition part for recognizing the obstacle surrounding the movement
route to the specific position from the current position of the robot estimated by
the self-position estimation part and the map data;

a warning area set part for setting an area having a possibility to interfere with an
obstacle as a warning area when the robot exists, based on the position of the
obstacle recognized by the obstacle recognition part;

a margin area set part for setting an area with a predetermined distance from the
warning area as a margin area, wherein the predetermined distance is set by a
plurality of characteristics associated with the robot; and

a safety area set part for setting an area distant from the margin area from the obstacle as a safety area, and

wherein the movement ease to the specific position is decided based on the area including the specific position and the area where the robot exists, respectively, applicable to either one of the warning area, the margin area and the safety area.

4. (Original) The robot control device according to claim 3, wherein the warning area set part decides the position of a circle where a distance between representative points of the surface of the obstacle is set as a diameter, and sets the warning area using the position of the circle.

5. (Currently Amended) The robot control device according to claim 1, wherein the behavior decision part decides at least anyone behavior of decided is one of a group of movement, the response of movement refusal, the reconfirmation of designation, stop movement, movement with caution, deceleration and acceleration.

6. (Original) The robot control device according to claim 1, wherein the voice recognition part has a designating range specification part for narrowing a designating area using a reference term, and the behavior decision part recognizes a specific position from the area of the logical product of the designating area narrowed by the designating range specification part and designating area recognized by the image recognition part.

7. (Currently Amended) The robot control device according to claim 1, further comprising a behavior schedule transmission part for outputting making the behavior control part output a behavior schedule.

8. (Currently Amended) A robot control method for controlling a robot having a microphone, an imaging device and a self-position detection device, comprising the steps of:

~~a designation content discriminating step of~~ recognizing the designation content of a designator based on sounds collected by the microphone[[],];

recognizing the designation content of the designator based on an image ~~imaged captured~~ by the imaging device[[],];

estimating the current position of the robot based on an output from the self-position detection device, ~~and~~;

~~retaining map data registering at least the position of an obstacle from a map data base;~~

deciding whether the designation of the movement to a specific position is required ~~based~~ ~~on from~~ the designation content recognized by the sounds and the designation content recognized from the image;

~~a movement ease deciding step of~~ deciding the movement ease to the specific position based on the current position ~~of the robot~~ estimated based on the output from the self-position detection device and ~~map data provided as a map data base and registering at least the position of an obstacle when the designation content discriminating step decides that the position of the obstacle from the map data base responsive to the~~ movement to the specific position ~~[[is]] being required, wherein the current position of the robot indicates at least one of a warning area, a margin area and a safety area in~~

which the robot exits, and each of the warning area, the margin area and the safety area is set based on the distance between the current position of the robot and the obstacle;

a behavior deciding step of deciding the behavior according to the decided movement case decided by the movement case deciding step; and

a behavior controlling step of executing the behavior according to the decision of the decided behavior deciding step.

9. (Currently Amended) The robot control method according to claim 8, wherein ~~the movement case deciding step reads deciding the movement case comprises reading the position of the obstacle surrounding the movement route to the specific position from the map data base, and [[sets]] setting at least two or more areas based on the distance from the obstacle, and the behavior deciding step decides the behavior according to an area wherein deciding the behavior comprises deciding the behavior according an area that including includes the specific position and an area where the robot exists.~~

10. (Currently Amended) The robot control method according to claim 8, wherein ~~the movement case deciding step includes deciding the movement case comprising:~~
~~an obstacle recognizing step of recognizing the obstacle surrounding the movement route to the specific position from the current position of the robot estimated based on the self-position detection device and the map data;~~

a warning area setting step of setting [[an]] a warning area having a possibility to interfere with an obstacle when the robot exists based on the position of the obstacle recognized by the obstacle recognizing step as a warning area;

a margin area setting step of setting [[an]] a margin area with a predetermined distance from the warning area as a margin area, wherein the predetermined distance is set by a plurality of characteristics associated with the robot;

a safety area setting step of setting [[an]] a safety area distant from the margin area from the obstacle as a safety area; and

wherein a step of deciding the movement ease to the specific position is decided based on the area including the specific position and the area where the robot exists, respectively applicable to either one of the warning area, the margin area and the safety area.

11. (Currently Amended) The robot control method according to Claim 10, wherein the warning area setting step decides setting the warning area comprises deciding the position of a circle where a distance between representative points of the surface of the obstacle is set as a diameter, and [[sets]] setting the warning area using the position of the circle.

12. (Currently Amended) The robot control method according to claim 8, wherein the behavior deciding step decides decided is one of a group of at least anyone behavior of movement, the response of movement refusal, the reconfirmation of designation, stop movement, movement with caution, deceleration and acceleration.

13. (Currently Amended) The robot control method according to claim 8, wherein the designating content recognizing step includes a designating range specifying step of recognizing the content of a designator based on sounds comprises narrowing a designating area using a reference term contained in the sound, and an image recognizing step of wherein recognizing the designation content of the designator based on the image comprises narrowing the designating area from the image, and the behavior deciding step recognizes wherein deciding the behavior comprises recognizing the specific position from the area of the logical product of the designating area narrowed by the sound recognition and image recognition designating range specifying step and designating area recognized by the image recognizing step.

14. (Currently Amended) The robot control method according to claim 8, wherein the behavior controlling step has a behavior schedule transmitting step for executing the behavior comprises outputting the behavior schedule decided by the behavior deciding step.

15. (Canceled)

16. (Currently Amended) A robot control program stored in a computer readable medium and executed by a computer processor for making a computer mounted on controlling a robot function as a voice recognition means for to perform the steps of: recognizing the designation content of a designator based on sounds collected by a microphone, recognizing the designation content of a designator based on sounds collected by a microphone;

an image recognition means for recognizing the designation content of the designator based on the image imaged captured by an imaging device[.]);

retaining map data registering at least the position of an obstacle from a map data base;

a self-position estimation means for estimating the current position of the robot based on [[the]] an output from [[the]] a self-position detection device,

a decision means for deciding whether the movement to a specific position is required based on the designation content recognized by the sounds and the designation content recognized from the image-recognition result of the voice recognition means and image recognition means, and the current position of the robot estimated by the self-position estimation part;

a movement-ease decision means for deciding the movement ease to the specific position based on the estimated current position of the robot estimated by the self-position estimation means and map data provided as a map data base and registering at least the position of an obstacle when the decision means decides that and the position of the obstacle from the map data based responsive to the movement to the specific position [[is]] being required, wherein the current position of the robot indicates at least one of a warning area, a margin area and a safety area in which the robot exists, and each of the warning area, the margin area and the safety area is set based on the distance between the current position of the robot and the obstacle; and;

a behavior decision means for deciding the behavior according to the decided movement case decided by the movement-ease decision means so as to control the robot having the microphone, the imaging device and the self-position detection device; and executing the behavior according the decided behavior.

17. (New) The robot control device according to claim 3, wherein the plurality of characteristics associated with the robot includes one of a group of size, shape, function, movement speed and braking distance of the robot.